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EX PARTE OR LATE FILED

April 21, 1995

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: IC Docket No. 94-31

In the Matter of
Preparation for International
Telecommunication Union
World Radiocommunication
Conference

Dear Mr. Caton:

Transmitted herewith by the National Academy of Sciences, through the Committee on Radio Frequencies of the National Research Council, are an original and nine (9) copies of its reply comments in the above-referenced proceedings.

If additional information is required concerning this matter, please communicate with this office.

Sincerely yours,

Robert L. Riemer

Robert L. Riemer
Senior Program Officer

Enclosure

cc: Members of CORF
Mr. Paul J. Feldman
Mr. Richard Gould
Dr. Donald C. Shapero

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Preparation for International	)	
Telecommunication Union	)	IC Docket No. 94-31
World Radiocommunication Conferences	)	

REPLY COMMENTS OF THE NATIONAL ACADEMY OF SCIENCES' COMMITTEE ON RADIO FREQUENCIES

The National Academy of Sciences, through the National Research Council's Committee on Radio Frequencies (hereinafter, "CORF"), hereby submits its Reply Comments in the above-captioned proceeding.[1] CORF represents the interests of the Radio Astronomy Service, the Earth-Exploration Satellite Service, the Space Research Service, and other users of the radio spectrum engaged in scientific research.

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[1]Reply Comments were due to be filed on April 14, 1995. Accordingly, CORF hereby moves for leave to file these Reply Comments. Due to the press of other business, including preparation of pleadings in other Commission proceedings, CORF was unable to complete the preparation of this pleading prior to the filing deadline. Good cause exists for accepting these Reply Comments because it contains factual and policy responses to issues raised in the WRC-95 proceeding which impact on the Radio Astronomy Service and thus on the public interest. Indeed, these Reply Comments are likely to be the only ones filed from the perspective of radio astronomers. Accepting these Reply Comments would not prejudice the rights of any parties, since Reply Comments are the end of the pleading cycle in this proceeding.

I. Introduction.

In its original Comments in this proceeding, CORF noted, inter alia, the importance of Radio Regulation ("RR") 733E in providing essential protection to the Radio Astronomy Service ("RAS") in the Primary allocation 1610.6-1613.8 MHz from unwanted emissions from other services in the band 1610-1626 MHz. In paragraph 24-27 of the Second NOI, the Commission considers the proposals of the Mobile-Satellite Service (MSS) operators that RR 733E be suppressed. CORF supports the portion of paragraph 27 that states that the Commission does not propose to suppress RR 733E, and CORF provided support for that position in its Comments. That support is extended in more detail in these Reply Comments.

II. Interference Protection for Radio Astronomy.

Iridium, Motorola, TRW, Constellation, and Loral all propose deletion of RR 733E and oppose replacing it with the protection rules embodied in the Commission's Report and Order on Big LEOs. Constellation objects that retaining the footnote is tantamount to reducing MSS to Secondary status. TRW states that elevation of RAS to Primary status has made the footnote "redundant." Motorola and Iridium believe the footnote should be suppressed, stating only that it is "no longer necessary," presumably for the same reason offered by Constellation and TRW: the elevation of RAS to Primary status. Loral also bases its proposal for suppression on the current Primary status of RAS, terming RR 733E "an anachronism." But providing necessary protection to a vulnerable and valuable scientific service without creating an undue burden for MSS system operators is still necessary, does not derogate the status of MSS, and is not anachronistic.

Constellation also implies that the continuing existence of RR 733E in the Radio Regulations was an "oversight" in the Final Acts of WARC-92 and attempts to explain its presence there by stating that it was "somehow" retained by the Conference. On the contrary, RR 733E, which was first adopted knowingly and purposefully at WARC-MOB 87, was retained at WARC-92 by the overt and unanimous actions of every participating administration, including the United States. The United States, after considering RR 733E in extenso, had knowingly, purposefully, and specifically, moved to strengthen it. With the full knowledge that radio astronomy had been elevated to Primary status in the band 1610.6-1613.8 MHz, the participants in WARC-92 extended the scope of RR 733E to cover all International Telecommunication Union (ITU) Regions, and added the MSS to the list of services specifically enjoined from causing interference to RAS from emissions arising from use of the full band, 1610-1626.5 MHz.

The retention and strengthening of the protection of RAS in the band 1610.6-1613.8 MHz continue a trend that began in 1987. Prior to the 1987 World Administrative Radio Conference (WARC-MOB 87), when RAS had only Secondary status in the band 1610.6-1613.8 MHz, former RR 734 urged administrations in making assignments to other services throughout the band 1610-1626.5 "to take all practical steps to protect the radio astronomy service from harmful interference," noting that "Emissions from space or airborne stations can be particularly serious sources of interference to the radio astronomy service."

WARC-MOB 87 replaced international footnote RR 734 with a stronger footnote: 733E. As it was then written, RR 733E applied throughout the entire 1610-1626.5 MHz band, but only in Regions 1 and 3. And it replaced the exhortatory admonition of

RR 734, which merely urged administrations to take all practical steps, with the mandatory and specific requirement that harmful interference must not be caused to RAS stations in the 1610.6-1613.8 MHz band by stations of the Radiodetermination Satellite Service ("RDSS"). In other words, the principle of protecting the RAS in the 1610.6-1613.8 MHz band from emissions arising in the 1610-1626.5 MHz band was initially adopted by design in 1987, and not "somehow" by "oversight" in 1992. Moreover, that protection was first instituted when the RAS had only Secondary status in the band segment 1610.6-1613.8 MHz.

WARC-92 elevated the RAS to Primary status in the band 1610.6-1613.8 MHz and added MSS as a Primary service in the entire band 1610-1626.5 MHz. Consequently, it amended RR 733E to include MSS as one of the services that must not cause interference to RAS stations.

Under the Radio Regulations, all radiocommunication services are protected to a certain extent from out-of-band emissions. In the case of radio astronomy, the extent of protection called for is given in ITU-R Recommendation 769, which sets forth the levels of interference harmful to radio astronomy. The levels for the 1.6 GHz band in ITU-R 769 are those that were used to establish the protection zones unanimously recommended by the FCC's "MSS Above 1 GHz Negotiated Rulemaking Committee," and that were then adopted by the Commission in its Report and Order ("R&O") and incorporated in the proposed rules.

The "additional measure of protection" granted to the RAS in this specific band is certainly warranted. The protection rules embodied in the R&O on Big LEOs require that a mobile earth terminal ("MES") operating in that portion of the 1.6 GHz band where RAS has co-Primary status keep a sufficient distance away

from an observatory to avoid causing harmful interference to it: it would not be fair, reasonable, or logical to permit other MESs operating in the adjacent band--even just over the band edge--to come arbitrarily close to such observatories where they would cause much more interference than an in-band MES 160 km away.

It was more than fairness, reason, and logic that persuaded the participants in the Commission's "MSS Above 1 GHz Negotiated Rulemaking Committee" to unanimously endorse protection to the RAS from both in-band and adjacent-band emissions and for the FCC subsequently to incorporate those recommendations in the proposed Rules: the FCC rules are one means of implementing the basic principle embodied in RR 733E that the MSS should not cause harmful interference to RAS in the band 1610.6-1613.8 MHz from emissions anywhere in the overall band 1610-1626.5 MHz.

There are precedents in the United States for protecting RAS from harmful out-of-band emissions from other bands. A particularly worrisome situation was that created by allocation of adjacent bands to two dissimilar services: the high-power, space-to-Earth, broadcasting-satellite service allocated to the 2500-2690 MHz band immediately below 2690 MHz, and the RAS, along with two other highly sensitive services, allocated to the 2690-2700 MHz band above that frequency. During the development of NASA's ATS-6 satellite in the 1970s, it became clear that harmful interference would be caused to the RAS if the out-of-band emissions of ATS-6 were not greatly attenuated. At significant weight and cost penalty, NASA added filters to the satellite's transmitter output, which also introduced some undesirable in-band power loss. But adherence to RR 733E will not be onerous or burdensome for MSS operators to achieve: the network control center of an MSS system will merely have to assign frequencies

sufficiently far removed from the band edge to the few MESs operating close to the few identified observatories at the limited and known times when observations are scheduled. With up to 15.9 MHz (80% of the overall band) available for such infrequent assignments, it will not be difficult for MSS operators to prevent interference to RAS while providing full service to their subscribers.

More recently, American Mobile Satellite Consortium ("AMSC"), recognizing the harmful interference that would otherwise occur, voluntarily agreed to add filters to its satellite transmitters to protect RAS in the 10.68-10.7 GHz band from out-of-band emissions arising from AMSC transmissions in the band 10.7-11.7 GHz.

III. Conclusion.

By retaining RR 733E, other administrations will also be obliged to protect their observatories from mobile earth terminals ("MES") operating within their territories. Moreover, RR 733E will also ensure protection of U.S. observatories from any foreign MESs, notably those in high-flying aircraft, and perhaps some in Canada and Mexico as well (operating within interference range of U.S. observatories). How other countries implement this protection is their decision. They may choose to adopt domestic rules similar to those recently adopted by the Commission (protection zones now, and perhaps beacon systems in the future), or they may adopt different but equally effective measures, but absent RR 733E they would not be obliged to do so.

Continuing U.S. endorsement for protection of the RAS was clearly demonstrated in the FCC's R&O dated October 13, 1994 (released October 14, 1994), on Amendment of the Commission's

Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands. In that R&O the Commission, noting the particular vulnerability of the RAS to harmful interference, incorporated the essence of Footnote 733E and extended protection to the RAS from harmful Mobile-Satellite Service emissions throughout the entire band 1610-1626.5 MHz. (See FCC R&O dated October 13, 1994, §§100-113). Responding to objections made by MSS interests during that rulemaking, the Commission stated that it did not believe that the protections provided in the amended regulations "relegate the MSS to co-primary or lower status." (R&O §13)

Finally, it appears unlikely to CORF that other administrations, having just retained, extended, and strengthened the protection to radio astronomy embodied in RR 733E, will agree to undo that protection only three years later and without any Recommendation on this subject--or even consideration of it--by the recently concluded Conference Preparatory Meeting (CPM) of the ITU's Radiocommunication Sector. CORF therefore strongly endorses the initial proposal of the Commission to retain RR 733E as vital protection for the Radio Astronomy Service.

Respectfully submitted,
NATIONAL ACADEMY OF SCIENCES'
COMMITTEE ON RADIO FREQUENCIES

By: Bruce Alberts

Bruce Alberts
President

April 21, 1995

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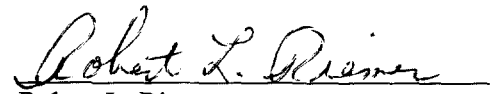
CERTIFICATE OF SERVICE

I, Robert L. Riemer, Senior Program Officer for the Committee on Radio Frequencies, do hereby certify that on this 21st day of April, 1995, a copy of the foregoing "Reply Comments of the Committee on Radio Frequencies" was sent by first-class U.S. mail, postage paid, or by hand delivery where indicated, to the following list.



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